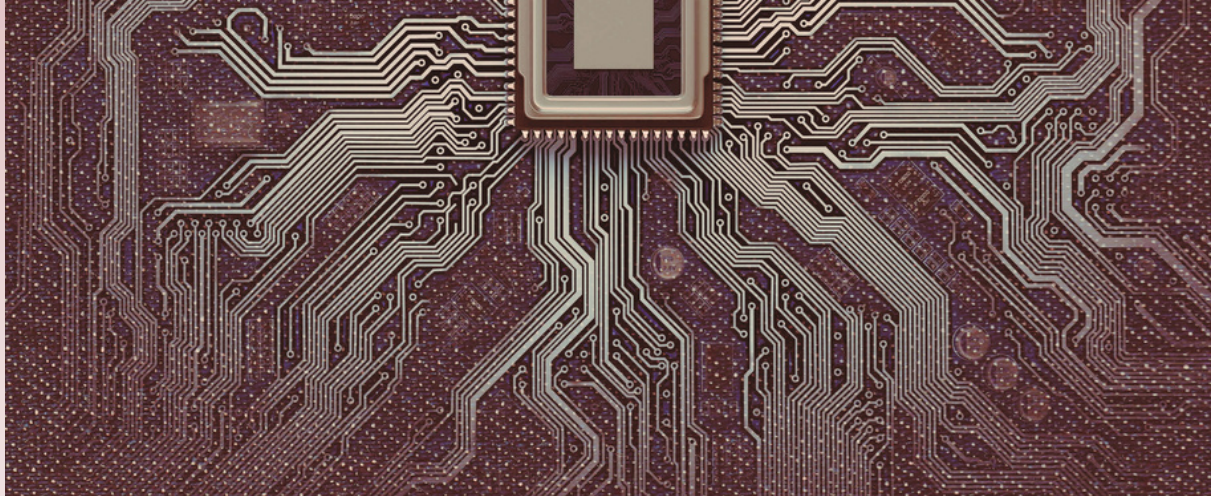




WELCOME TO E-TEXTILES 2023 CONFERENCE

5TH INTERNATIONAL CONFERENCE ON THE CHALLENGES,
OPPORTUNITIES, INNOVATIONS AND APPLICATIONS IN
ELECTRONIC TEXTILES

14TH - 16TH NOVEMBER 2023 | GHENT, BELGIUM



Manufacturing
& Materials



Sensing and
Actuating



Reliability,
Sustainability
& Future
Trends



Standards &
Certification



Work Wear &
Protective
Apparel
Applications



Healthcare &
Sports
Applications



Energy
Solutions
for E-Textiles



Design &
Fashion

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University of
Southampton



E-Textiles Network



KEYNOTE SPEAKERS

Pauline Van Dongen

Pauline Van Dongen Studio

Smart Textiles: A Journey of the Senses and Connection

Pauline van Dongen is a Dutch fashion designer. As a creator interested in the notion of dynamic expression in fashion, she researches how textiles and other materials mediate between the human body and its surroundings. She sees in technology an opportunity to create new, meaningful and potentially even more durable relationships with the things we wear.



Wim Christiaens

Quad Industries

The Power of Printed Electronics in E-Textiles

Wim Christiaens is a leading expert in flexible and stretchable electronics. His PhD in electronic engineering from Ghent University focused on integrating passive and active components into flexible circuit boards. Wim Christiaens has held various positions in technology and business development, driven by his unwavering passion for innovation.



Nazmul Karim

Nottingham Trent University, UK

New material-based future textiles

Nazmul Karim is a Professor of Advanced Textiles at the Nottingham Trent University. In addition to advanced materials (graphene, other 2D materials), Prof Karim is also interested in sustainable digital technologies (e.g., inkjet printing), as well as scalable, cost-effective next-generation wearable electronic textiles (e-textiles), natural fibre reinforced composites, and bio-based or recycled functional clothing.



Radek Soukup

University of West Bohemia

New Perspective Technologies for Integrating Electronic Components into Textiles

Radek Soukup has led 8 national and 5 international applied research projects. In 2018, he was recognized as a EUREKA Success Story for the EURIPIDES EUREKA project ADVANTEX. His current position is as Director of the Smart Textiles Group at the University of West Bohemia. The hybrid conductive thread, smart firefighter's suit, and smart protective glove, among others, were developed by him along with his team and industrial partners.



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INVITED SPEAKERS

Vladan Koncar

GEMTEX



How to Develop Standards for E-Textiles

Vladan Koncar is a Professor at the ENSAIT (Textile graduate school) in Roubaix, France, affiliated with the University of Lille. His research interests primarily revolve around flexible textile sensors and actuators, smart clothing and e-textiles, and the modelling and control of complex systems. He is currently GEMTEX's international relations director.



Vera De Glas

SIOEN

Smart Wearables in PPE – Yesterday Today Tomorrow

Vera has been at the forefront of innovative personal protective textile technologies, pushing boundaries and revolutionizing the way we see and develop them. She is a member of some 15 European and international technical committees for protective clothing, textiles and personal protective equipment.



Sigrid Rotzler



Technische Universität Berlin / Fraunhofer IZM

Washability for E-Textiles: A comparative study of the washing reliability of different types of textile integrated circuits

Sigrid Rotzler is a researcher at the Fraunhofer Institute for Reliability and Microintegration IZM working on the development of e-textiles with a focus on reliability testing and integration technologies. After completing her

Master's thesis at Fraunhofer IZM on washability of textile integrated circuits, she has continued her PhD research on the same field. In her role as vice-chair of the D-75A E-Textiles Wearables Standard Task Group of the IPC, Sigrid works towards standardized testing and reliability standards.



Kevin Rodrigues

CeNTI

Smart Materials enabled textile applications for Health Devices

Kevin Rodrigues is a researcher and Team Leader at CeNTI's Smart Materials Department at the Smart Textiles & Structures team. Throughout his career, he specialized in printed and flexible electronic technologies for developing sensors, actuators, and devices.

During his 6 years at CeNTI, he has been involved in different projects with multisectoral applications, e.g. health, automotive, and construction, obtaining solid knowledge in innovative concepts, disruptive technologies, and integration processes in several areas.



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INVITED SPEAKERS

Theodore Hughes-Riley 
Nottingham School of Art & Design

The design and development of electronic textiles and yarns
for sport and healthcare applications

Prof Theodore Hughes-Riley is an Associate Professor in Electronic Textiles at Nottingham Trent University (UK) and a member of the Advanced Textiles Research Group (ATRG) in the Nottingham School of Art and Design. He has completed a substantial body of research into how to embed small electronic devices into yarns, resulting in the creation of numerous sensing devices, including temperature sensing, motion sensing, and light sensing textiles.



 **Stephen Beeby**
University of Southampton

Energy harvesting and storage technologies for e-textiles

Prof Steve Beeby is a Professor of Electronic Systems and Devices at the University of Southampton. His research interests include e-textiles, energy harvesting, sensor systems, flexible smart materials and solution-based processing. He has been investigating e-textiles for over 15 years and holds a prestigious Royal Academy of Engineering Chair in Emerging Technologies on the subject of e-textiles engineering. He has previously held two EPSRC Research Fellowships on printed smart materials and the application of energy harvesting on textiles.



Jeanne Tan 
AiDLab

AI and Textiles for Fashion, Interiors and Rehabilitation

Prof. Jeanne Tan is the COO of the Laboratory of Artificial Intelligence in Design (AiDLab) and a Professor of Fashion and Textiles at The Hong Kong Polytechnic University (HKPolyU). She is a design practitioner who investigates creative innovation that interfaces design and technology. Her research focuses on intelligent textile design for fashion, interiors, rehabilitation, and Design-Led STEM processes. Jeanne's research in intelligent textiles had been patented and commercially licensed for real-world applications.



 **Lieva Van Langenhove**
Ghent University

Smart Textiles and Comfort

Prof. Lieva Van Langenhove is a professor in textile engineering at Ghent University, Center for Textile Science and Engineering. Her expertise includes mechanics of textile materials and processes and comfort of textiles. Research includes conceptual design, modelling and simulation, prototyping and testing. She launched the research on smart textiles in 2000. It has evolved into the development of (semi)conductivity based multifunctional textiles for monitoring, actuation, energy supply and communication.



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NOV 14TH - TUESDAY

12:00pm - 2:00pm

Conference doors open -- registration/check-in at Zebrstraat

2:00pm - 2:30pm

Opening address from UGent/imec

Location: Ned Kahn

2:30pm - 4:00pm

Introductions from
exhibitors / demonstrators

Posters' 1-min pitch

- 105
The behaviour of micro-pressure sensors embedded within yarns -- Nishadi Perera
- 112
Electromechanical Behavior of Helical Auxetic Yarn Strain Sensors -- Saba Sajjadih
- 114
Evaluation of The Performance Of Soft, Stretchable And Fully Textile-Based Heaters -- Beyza Bozali
- 115
Digital Identification enabling circularity in the mattress industry -- Rik Holvoet
- 116
All-textile sensor garments -- Kaspar Jansen
- 117
Dung Dkar Cloak - Exploring Soft Interfaces for Sonic Interactions -- Judit Eszter Kárpáti
- 118
Industrialization of Smart Gowns with integrated textile-based heating systems -- Marta Sofia da Silva Midão
- 120
Fabrication of Electronic Silk Fabrics via RGO adhesion incorporating Oxygen Plasma Treatment -- Bornali Sarma
- 124
Controlled Sweat Removal in Performance Wear Through Electrically-Activated Textiles -- Magdalena Georgievska
- 125
Fabrication of a Screen-printed E-textile Interdigitated Capacitive Sensor for Measuring Stratum Corneum Hydration -- Alexandar Radoslavov Todorov
- 126
Investigating Construction and Integration Techniques of Dry Silver-Based Textile Electrodes on Electromyography of Biceps Brachii Muscle -- Rohil J Dave
- 133
Design of an E-textile sock for fall and near-fall detection -- Zahra Rahemtulla
- 134
Developing an Ambient Light Stretch Sensor with Pleated Textiles -- Zora Kutz
- 139
Using embroidered interdigitated electrodes (IDTs) to monitor biomarkers present in human sweat -- Bethany Victoria Orme
- 140
Conformable, Wearable Embroidered Temperature Sensor for Real-Time Monitoring in Extreme Environments.-- Emmy Louise Amers
- 145
The influence of distance between electrode and noise reduction buffer amplifiers in ECG monitoring using knitted electrodes -- Tom Greig
- 147
Simulation of Thermal-Electrical and Mechanical behavior of Conductive Yarns -- Kirsten Weide-Zaage
- 148
Bi2Te3 infused carbon nanotube yarns for yarn shaped thermoelectrics -- Xiaona Yang
- 150
Recent progress to address the challenges of conductive inks for e-textiles -- Raphael Kanyire Seidu
- 151
Simultaneous enhancement in thermoelectric and mechanical properties of aramid nanofiber /Bi2Te3 composite films for wearable thermoelectric fabric -- Xinyi Chen
- 153
Designing a modular, wearable biosensing platform for protein detection in humans and animals -- Jessica Stanley
- 154
Characterisation and Optimization of Solar Energy Harvesting Textile to Power Wearable Devices -- Parvin Ebrahimi
- 155
Textile Solid-State Zinc-ion Capacitor -- Sheng Yong / Stephen Beeby
- 161
An IoT-enabled Knee-sleeve for Home Rehabilitation: A Pilot Study -- Luz Alejandra Magre / David Gibbons
- 162
Reverse Offset Printing for Fabricating E-textiles -- Huanghao Dai
- 163
Exploring sustainable approaches in designing textiles embedded with micro-devices -- Nishadi Perera
- 165
Correlation between smart mask and knitted RIP breathing data -- Kristel Fobelets
- 166
Single Electrode Textile Based Capacitive Pressure Sensor Array -- Saba Sajjadih
- 168
Embroidery Triboelectric Nanogenerator -- Hasan Tahir
- 171
UVC-enabled Smart Bandage for Treatment and Temperature Monitoring of Chronic Wounds -- Irfan Ullah
- 173
Innovative Horizons: Pioneering E-Textile Speaker Fabrication with using the CleverTex Hybrid Conductive Threads -- Jiri Navratil
- 174
Connection techniques of textile wires to the solid and flexible solar cells -- Zhou Li / Elina Ilen

4:00pm - 7:00pm

Poster and demo session

Drinks and networking

Location: Expo

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NOV 15TH - WEDNESDAY

9:00am - 9:35am -- Keynote Radek Soukup
Location: Ned Kahn

9:35am - 9:55am -- Theodore Hughes-Riley - The design and development of electronic textiles and yarns for sport and healthcare applications

9:55am - 10:40am -- Healthcare and Sport applications -- Chair: Kai Yang
Development and Evaluation of Wearable ECG Monitoring System
Abreha Nigusse -- Gent University, Belgium

Improved Skin-Impedance characterization of Embroidered-textile Electrodes for sustainable Long-term EMG monitoring
Bulcha Belay Etana -- Ghent University, Belgium

Smart Textile Pressure Sensor Matrices – Investigation of sensor characteristics for use in the surgical environment
Nicolette Dullesco Sizer -- Medical Engineering Design Research Group (MEDRG), Nottingham Trent University, Great Britain

10:40am - 11:00am
COFFEE BREAK -- POSTERS -- DEMOS
Location: Ned Kahn / Expo

11:00am - 11:20am -- Stephen Beeby - Energy harvesting and storage technologies for e-textiles
Location: Ned Kahn

11:20am - 11:50am -- Energy solutions for e-textiles -- Chair: Frederick Bossuyt
High-performance Graphene/PVA Spray-Coated Electrode for Wearable Triboelectric Nanogenerators
Hongyang Dang -- Department of Physics and Astronomy, University of Catania -- CNR-IMM, Catania University Unit
Scalable manufacturing durable, tailorable and recyclable multifunctional woven thermoelectric textile system
Yuanyuan Jing -- Donghua University, Shanghai, China

11:50am - 1:30pm -- Lunch break -- POSTERS -- DEMOS
Location: Expo

1:30pm - 2:05pm -- Keynote Pauline van Dongen
Location: Ned Kahn

2:05pm - 2:25pm -- Jeanne Tan - AI and Textiles for Fashion, Interiors and Rehabilitation

2:25pm - 3:10pm -- Design & Fashion -- Chair: Jessica Saunders
Understanding the Adoption of Smart Textiles: Insights from Innovation Theory and Interpretative Phenomenological Analysis of Interactive Experiences
Ramona Cristina Cook -- Nottingham Trent University, United Kingdom
Design and test of a Haptic-Stimulated Mindfulness Vest for Guided Breathing
Wei Wang -- School of Design of Politecnico di Milano
Empowering Textile and Fashion Designers with E-Textiles for Creative Expression
Mei Zhang -- Queen Mary University of London, United Kingdom

3:10pm - 3:30pm -- COFFEE BREAK -- POSTERS -- DEMOS
Location: Ned Kahn / Expo

3:30pm - 3:50pm -- Sigrid Rotzler - Washability for E-Textiles: A comparative study of the washing reliability of different types of textile integrated circuits
Location: Ned Kahn

3:50pm - 4:35pm -- Reliability, Sustainability & Future trends -- Chair: Malte von Krshiwoblozki
Durability testing of Knitted E-Textiles and Design of User-Friendly E-Sleeve for Stroke Arm and Hand Rehabilitation
Meijing Liu -- Winchester School of Art, University of Southampton
FOYSE Technology: A Novel Manufacturing Process for Noninterlaced Textiles Providing a Sustainable Solution for Future Mesh Materials
Sonia Reynolds -- Zephlinear LTD, United Kingdom
Weaving Together Disciplines: Service Blueprinting for Multidisciplinary E-Textile Design
Melissa Esmeralda van Schaik -- Sustainable and Functional Textiles, Saxion University of Applied Sciences, Enschede, The Netherlands

4:35pm - 4:50pm -- Judith Bosch - ETP/Smart X --
SmartX: Fostering an Innovators' Community to boost Smart Textiles Revolution

4:50pm - 6:00pm
Panel Discussion - How to bring e-textiles to the market in a sustainable way

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NOV 16TH - THURSDAY

9:00am - 9:35am -- Keynote Wim Christiaens
Location: Ned Kahn

9:35am - 9:55am -- Kevin Rodriguez - Smart Materials enabled textile applications for Health Devices

9:55am - 10:40am -- Manufacturing & Materials -- Chair: Steve Beeby
Assembly of Fine Pitch Packaged Integrated Circuits in Conductive Transfer Process for E-Textiles Applications
Yi Li, Tom Greig -- SEMS, ECS, University of Southampton, United Kingdom
Mass Production of E-Textiles by Using Embroidery Technology
Steliyan Vasilev -- 1: 3E Smart Solutions, Germany
Performance quality of braided e-yarns for pedestrian interactive textiles
Raphael Kanyire Seidu -- School of Fashion and Textiles, The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

10:40am - 11:00am -- COFFEE BREAK -- POSTERS -- DEMOS
Location: Ned Kahn / Expo

11:00am - 11:20am -- Vladan Koncar - How to Develop Standards for E-Textiles
Location: Ned Kahn

11:20am - 12:05am -- Standards & Certification -- Chair: Paula Veske
E-textiles and Standards – an Overview
Karin Rachel Eufinger -- Centexbel, Belgium
Analysing the Contributing Factors to Activity Recognition with Loose Clothing
Renad Allagani -- King's College London, United Kingdom
Characterization of textile electrodes for bioelectric signal acquisition
Hammoudeh Bouzan -- TITV Greiz, Germany

12:05am - 1:30pm -- Lunch break -- POSTERS -- DEMOS
Location: Expo

1:30pm - 2:10pm -- Keynote Nazmul Karim
Location: Ned Kahn

2:10pm - 2:30pm -- Vera De Glas - Smart Wearables in PPE – Yesterday Today Tomorrow

2:30pm - 3:00pm -- Work wear and Protective apparel applications -- Chair: Russel Torah
Intelligent thermoregulation in personal protective equipment
Alireza Saidi -- Robert Sauvé Research Institute for Occupational Health and Safety, Canada
Sun-powered textiles -Energy-autonomous wearables with textile-embedded solar cells
Janne Halme -- Aalto University School of Science, Finland

3:00pm - 3:15pm -- COFFEE BREAK -- POSTERS -- DEMOS
Location: Ned Kahn / Expo

3:15pm - 3:35pm -- Lieva Van Langenhove - Smart Textiles and Comfort
Location: Ned Kahn

3:35pm - 4:20pm -- Sensing & Actuating -- Chair: Theo Hughes-Riley
HACS4x: 4-Ply Helical Auxetic Capacitive Sensors for Strain Sensing E-textiles
Brett Christopher Hannigan -- ETH Zürich, Switzerland
Case Study: Healables® ElectroGear® Wearable E-Textile Sleeve with Embedded Microcurrent Electrodes and Physiologic Motion Sensors to Enhance and Monitor Sports Performance in a Baseball Pitcher
Moshe Lebowitz -- Healables Ltd., Israel
The Initial development of an electronic yarn with haptic feedback for wearable systems
Malindu Ehelagasthenna -- Nottingham Trent University, United Kingdom

4:20pm - 5:00pm
Awards & Closing speech

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